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A Survey Paper On Feed Forward Convolutional Neural Network Approach For Predicting Covid Disease.

Umap Dnyaneshwari R. [1], Prof. Kanade P.G. [2], Prof Gade S.A

ME Student, Department of Computer Engineering[1] ,
Head of Department, Department of Computer Engineering[2]
SND College of Engineering and Research Center, Yeola, Nashik, India

Abstract: For detecting covid-19 and checking the severity of the patients condition ct examination of the lungs is significant however the current manual viewing of ct images requires professionalism in order to improve the inspection efficiency of the huge number of ct images it is necessary to develop an intelligent detection algorithm to perform ct inspections this paper proposes a covid-19 detection algorithm based on efficientdet efficientdet leverages a faster and easier multi-scale fusion approach which is more suitable for covid 19 detection tasks with finer feature granularity in addition data augmentation is also significant in covid-19 detection tasks this paper verifies the effectiveness of efficientdet on the siim fisabio-rsna covid-19 detection dataset provided by kaggle platform experimental results show that efficientdet has achieved better performance than other detection algorithms taking map05 as an indicator efficientdet reaches 0545 which is 79and yolo-v5 index termscovid

Keywords- COVID-19, X-rays, transfer learning, convolutional neural networks, EfficientDet, data augmentation, Big Data, Deep learning, Artificial intelligence (AI), Healthcare, Machine learning (ML)

I. INTRODUCTION

covid-19 is a major new infectious disease and the new crown pneumonia epidemic has undoubtedly had a profound impact on the normal operation of countries around the world revenues from industries such as retail catering accommodation and tourism have fallen sharply manufacturing and real estate are slow to resume work and production due to liquidity constraints the epidemic has brought different challenges to various industries to meet the challenge rapid testing for covid-19 is particularly important the computer-aided diagnosis system has a certain value for doctors to screen chest radiographs and judge the lesions there are many patients who have serious ct examinations but negative nucleic acid tests at this time it is necessary to combine ct to diagnose through comprehensive analysis ct can help doctors quickly determine whether a patient has pneumonia what is its scope and degree what stage the disease is in and so on with the rapid development of artificial intelligence and big data technology ct image pathology detection algorithms have also made significant progress common target detection models such as yolo and fpn have been applied in the direction achieve better performance if the resource is expanded for example the network depth network width and input image resolution however it is difficult to manually adjust the depth width and resolution in other words the combination space is too large manpower cannot be exhausted in addition the fpns involves multi-scale fusion detection algorithms when fusing different input features it just adds the features without distinction however different input features have different resolutions and their contributions to the fusion output features are often unequal based on the above considerations this paper uses efficientdet as the basic detection model for covid-19 ct image detection on the one hand efficientdet comprehensively considers network depth network width and input image resolution to achieve better performance on the other hand efficientdet performs efficient multi-scale feature fusion introducing learnable weights to learn the importance of different input features and

repeatedly applying top-down and bottom-up multi-scale feature fusion methods to improve model performance in addition we have implemented various data enhancement methods such as flip crop and rotation for the original data such methods have effectively improved the robustness of the model.

1.1 Motivation

the difficulties medical practitioners encounter in identifying covid-19 are the driving force behind the use of cnns over covid-19 prediction conventional diagnostic even though rt-pcr tests are dependable they take a lot of time and are not always available particularly in environments with limited resources the efficient substitute that swift covid-19 screening is healthcare imaging such as ct exams of lung x-rays cnns can help with early detection and lessen the diagnostic pressure on health care systems because of their capacity to autonomously deduce intricate patterns from images the following are the main reasons to use cnns to predict covid-19 quick detection artificial intelligence ai can speed up and automating the procedure for diagnosing illness saving time for medical personnel to analyze the findings non-invasive testing diagnostics based on imaging might be less invasive and time-consuming than.

1.2 Objective

using a feed forward convolutional neural networks main goal creating a model that can efficiently evaluate chest x-ray or ct scan pictures to differentiate between infected and noninfected in order to predict covid-19 instances among the particular objectives are accurate diagnosis to develop a model that uses medical imaging data to accurately sensitively and specifically identify covid-19 infections automation by streamlining the image analysis procedure medical personnels workloads will be lessened early detection to aid in the early identification of covid-19 infections via providing more rapid and more accurate testing instruments generalization to create a model that performs well across a range of age groups demographics and imaging scenarios

II. LITERATURE SURVEY

[1] Mark Wu1, University of Wisconsin - Madison, Madison, United States, A computed tomography (CT) scan of the respiratory system is necessary for the diagnosis of COVID-19 and for assessing the severity of a patient's illness. The present manual CT picture viewing method, however, necessitates a specialist. To enhance the examination.

[2] Akshay Kumar Siddhu, Dr. Ashok Kumar and Dr. Shakti Kundu A patient confirmed to have COVID-19 typically presents with symptoms such as fever, fatigue, and a dry cough. The COVID-19 pandemic is affecting populations globally. This review paper utilized a collection of X-ray and CT-Scan images from patients diagnosed with common bacterial pneumonia, those confirmed with COVID-19, and typical cases, to facilitate the automatic detection of coronavirus infection.

[3] Iosif Mporas School of Physics Engineering and Computer Science, University of Hertfordshire, Hatfield AL10 9AB, United Kingdom Publicly accessible datasets were used, and several configurations were tested with each one either alone or in combination. The algorithms that performed most effectively out of all those that were assessed were the Results from the Dense Net, ResNet, was developed and Xception all modeling suggest that it may be possible to identify COVID-19 positive cases from chest X-ray data.

III. EXISTING SYSTEM

COVID-19-positive instances The use of convolutional neural networks is used for detection. Specifically, we employed popular deep CNN models to classify photos that
We retrained them to distinguish between COVID-19 positive and negative cases after pre-training them using sizable image collections. Following preprocessing, clinically diagnosed COVID-19 positive images of the chest are utilized to retrain pre-existing deep CNN models for image categorization. X-ray image preparation includes pixel value normalization and image scaling to satisfy each pretrained deep neural network machine learning model's feedback requirements.

IV. METHODOLOGY

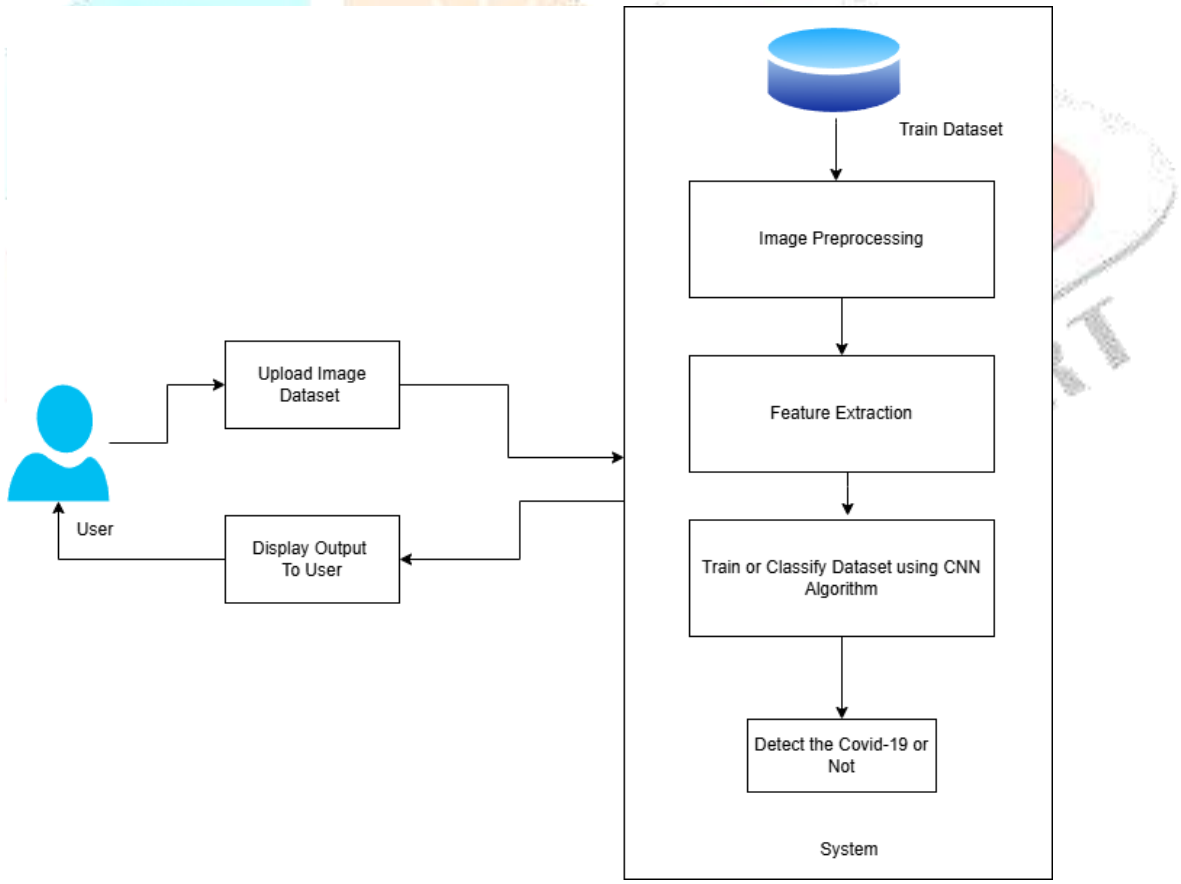
PROPOSE SYSTEM

Data Collection The first step is to collect a relevant dataset. For COVID-19 prediction, data sources could include: Medical
Imaging (X-rays, CT scans, or chest radiographs of COVID-19 patients)Public datasets such as COVID-19 Image Data Collection
(Kaggle, etc.) Patient Medical Data (If not using images) Features like age, gender, travel history, symptoms (fever, cough, fatigue, etc.), lab test results, and pre-existing conditions (e.g., diabetes, hypertension) Data Preprocessing.

Image Preprocessing:
Normalize pixel values to a range [0, 1] or [-1, 1]. Augment the dataset (e.g., rotations, flips, and zooms) to increase the model's robustness.

Feature Engineering for Non-image Data:
Standardize continuous features (e.g., age, temperature) and encode categorical features (e.g., gender, travel history). Handle missing data (using imputation methods or removing rows/columns with excessive missing values).

System Architecture:-



System Architecture Diagram

V. RESULT AND DISCUSSION

Integration with Other Modalities: Combining CNNs with other types of neural networks(e.g., recurrent neural networks for sequential data like time-series patient records) could improve prediction accuracy. Hybrid models that combine image data with clinical data could offer more robust predictions. Real-Time Deployment: There is a growing need for real-time diagnostic tools in hospitals. Integrating the model with medical imaging devices could provide instant predictions during patient examinations.
Explainable AI: As AI in healthcare grows, the interpretability of the model is essential. Developing techniques to explain CNN predictions (e.g., using Grad-CAM or SHAP values) can make the system more trustworthy for medical professionals.

Transfer Learning: improving generalization and reducing the need for large annotated datasets in every new deployment.
Incorporating Multi-Modal Data: Combining medical imaging, clinical history, and genetic data can create more accurate prediction models that take a holistic view of a patient's health.

VI. CONCLUSION

The recent COVID-19 outbreak has led to numerous fatalities, particularly among the elderly and those with pre-existing health issues. The conventional method for COVID-19 detection and diagnosis involves the reverse-transcription polymerase chain reaction (RT-PCR) test following the collection of appropriate respiratory samples, which is often a lengthy process and can be unaffordable for many. Therefore, there is a need for the creation of new, low-cost rapid diagnostic tests to aid in clinical evaluation. We presented a study evaluating the use of transfer learning with pretrained deep convolutional neural network models for identifying COVID-19 through chest X-ray images. Two publicly accessible datasets were utilized across various experimental configurations. Specifically, we assessed the binary identification performance of several convolutional neural network models using 10-fold cross-validation on each dataset individually, and then we examined the transferability of these models . Lastly, we combined the two datasets and conducted 10-fold cross-validation to explore how the volume of available data impacts metrics such as accuracy, precision, and recall. The results of the experiments highlighted the potential for developing diagnostic tools for the automatic identification of COVID-19 positive cases from chest X-ray images using deep convolutional neural networks, and advancing larger and clinically standardized datasets would further aid this effort.

VII. REFERENCES

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